

116

Notice of Allowability	Application No.	Applicant(s)	
	10/045,907	CACHIN ET AL.	
	Examiner	Art Unit	
	Tan Lien	2141	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
 All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 1/11/02.
2. ☒ The allowed claim(s) is/are 1-21.
3. ☒ The drawings filed on 11 January 2002 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☒ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

Examiner's Amendment

An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicant, an amendment maybe filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The Examiner has called the attorney (Louis Herzberg, registration ID 41500) on February 17, 2005 to notify him of the error in priority date claimed in the Oath and Declaration and that it is inconsistent with the date in the Foreign Priority Papers filed. The attorney has stated that he will correct the error in the priority date claimed in the Oath and Declaration paper.

There's also a typographical error on page 40, line 1. The first step in the agreement loop should start with 1) instead of 2).

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance:

In interpreting the claims in light of the specification, the Examiner finds the claimed invention to be patentably distinct from the prior art of record.

Dolev et al. (US Patent 4,569,015) teach a method for achieving Byzantine Agreement among active networked processors wherein the number of phases and messages required to achieve agreement are bounded, and wherein the processors exchanged authenticated broadcast messages in synchronized phases. In other words, the method for achieving Byzantine Agreement operates on n processors coupled in a reliable $(t+1)$ connected network where at most $t < (n/2)$ processors/links are faulty, and that the agreement can be achieved in $(t+2)$ phases. The method is attained by the following steps: (a) broadcasting a value message by an originating processor with its unforgeable signature to all active processors including itself; (b) each receiving processor passing such a message on and appending its own unforgeable signature thereto to all other active processors including itself; and (c) each active processor agreeing to the message value and stopping at the end of the first two message passings if every active processor has signed, obtaining unanimous support, and if the number of signatures is at least $t+1$ but not unanimous, signing and sending the message with the $t+1$ signatures, each processor not stopped by unanimous support continuing the steps of repeatedly sending messages when received, and appending its signature thereto until $t+2$ message passings having occurred, at this time either agreeing to the value if at least $t+1$ signatures append the message, or otherwise assuming a default value.

Johnson et al. (US Patent 5,390,302) teach a transaction management protocol for a multi-processor computer system where the processors are organized in a multi-level hierarchy. The protocol comprises: a Prepare phase in which PREPARE message

Art Unit: 2141

are distributed down the hierarchy, VOTE messages are returned up the hierarchy, and prepare records are forced-written as the VOTE message are return; and a Commit phase in which, if committal is to proceed, COMMIT messages are distributed down through the hierarchy, Commit activity is performed and commit records are written as the COMMIT messages are received, and ACK messages are returned up the hierarchy; and wherein commit records are written only by processors in which data records have been changed, and the ACK messages are returned in strict sequential order up the hierarchy and end records are lazy-written as the ACK messages are received.

As to claim 1, the prior art of record fails to teach or suggest individually or in combination a method for achieving agreement among n participating network devices in an asynchronous network. Furthermore, the prior art of record fails to teach broadcasting echo messages comprising a proposed justification by using verifiable and consistent broadcast and receiving n-t echo messages comprising candidate values and candidate justifications satisfying a predicate (Q). Moreover, the prior art of record fails to teach broadcasting and receiving vote messages comprising candidate device identifier and either a first agree-value (Y) together with the candidate value and the candidate justification, or a second agree-value (N) satisfying the predicate (Q).

Claims 2-8, 12-14, 18, and 20-21 are allowed because of the combination of limitations and rationale listed above.


As to claim 9, the prior art of record fails to teach or suggest individually or in combination a method for reliably broadcasting messages in an order within an asynchronous network comprising n participating network devices and tolerating a number t of less than $n/3$ faulty participating network devices. Furthermore, the prior art of record fails to teach or suggest individually or in combination the steps of the method comprising: receiving a number c of at least $t+1$ queue messages comprising c proposed queues and proposed signatures stored in a queue vector (QV) and a signature vector (SV); and proposing the queue vector (QV) for Byzantine agreement validated by the signature vector (SV) and performing a method for achieving agreement on a common value being validated by a justification (p) together satisfying a predetermined predicate (Q) by validating the queue vector (QV) and the signature vector (SV) through a determined predicate (Q) asserting that the signature vector (SV) comprises c valid signature entries of distinct participating network devices on entries of the queue vector (QV).

Claims 10-11, 15-17, and 19 are allowed because of the combination of limitations and rationale listed above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Application/Control Number: 10/045,907
Art Unit: 2141

Page 6


SUPERVISOR PATENT EXAMINER